KNOW YOUR COCHLEAR IMPLANT

AN AURAL REHABILITATION TECHNOLOGY
WITH SPECIFIC REFERENCE TO
ADIP SCHEME
(REVISED-2022)

AYJNISHD(D)

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1. AN OVERVIEW OF COCHLEAR IMPLANT

A cochlear implant is an electronic device and relatively now technological option to facilitate hearing. This option has been a successful and approved method of treating bilateral severe to profound sensor neural hearing loss for persons since the mid -1980s, for those who are unable to be helped with conventional hearing aids. This small electronic device is surgically implanted under the skin behind the ear (Figure-1). The Implant bypasses the damaged parts of the Inner ear more specifically inner hair cells and electrically stimulates the auditory nerve libers in the cochlea.

Figure-1. Showing some part of Cochlear implant as worn on the body and some parts surgically implanted in the skull.

2. COMPONENTS OF COCHLEAR IMPLANT

The Cochlear implant consists of external and internal components. External components include microphone, speech processor and head piece see Figure 2(a), whereas internal components consist of receiver (coil) and electrode array see Figure 2(b). The external device is worn on the body and internal components are surgically implanted in the ear (cochlea) shown in Figure -1

Figure 2 (a). External components

Figure 2(b): Internal components

3. **WORKING OF COCHLEAR IMPLANT**

The working of cochlear implant can be simply described in the following steps

• Environmental sound waves are picked up by the microphone which are then sent to a speech processor via a thin cable that can be worn behind-the-ear device (looks like a hearing aid) as shown in Figure 2(a)

• The speech processor is a powerful miniature computer that translates incoming environmental sounds into distinct electrical codes. The speech signal is sent through the same cable, to the headpiece and transmitted across the skin via radio waves to the surgically implanted device.

• This signal is picked up by the receiver (Figure 2b) and then travels down to the electrode array that has been positioned within the inner ear and stimulates the auditory nerve. This electrical information eventually is interpreted as meaningful sound in the brain.

• In simple words, it works by sending speech (electrical impulses) directly to the auditory nerve which further carries these signals to the brain for comprehension.

• This type of signal processing and transmission can benefit individuals/children who have useful speech perception and recognition even with continuous use of 3 to 6 months of high powered hearing aids.

• Cochlear implant provides the optimal sound quality essential for successful auditory stimulation for speech and language development. While it may take some time, even months and years, most children/ individuals acquire and develop speech and language skills. However, post implantation communication training is essential al east for one year for children to acquire and develop usable oral communication.

4. **WHO CAN BENEFIT FROM COCHLEAR IMPLANTATION (As per ADIP Guidelines)**

The revised ADIP scheme (effective from 2022) guidelines clearly mention following criteria for children who can benefit from cochlear Implant surgery and speech and language intervention. The guidelines say aloud that the potential candidates for Cochlear Implantation are:

• A child in age range of 1-5 years having probably congenital or at birth hearing loss or post lingual deafness up to the age of 18 years.

• A child with bilateral severe to profound sensorineural hearing loss

• Child should not suffer from any additional disability.

• A child should have used the hearing aid for at least 3 to 6 months with no observable

benefit from the amplification and speech and language intervention.

5. CONTRAINDICATIONS FOR COCHLEAR IMPLANTATION

As per the ADIP scheme (Revised 2022) cochlear implantation a contra indicated for individuals who have the following conditions:

• Late identified children with bilateral severe to profound hearing loss with no intervention.

• Children having psychological conditions like mental retardation and other behavioural issues that can hinder the development of verbal communication

• Children having hearing problems or lesions in the acoustic nerve or central auditory pathway.

• Active middle ear disease such as ear discharge

• Congenital absence of cochlea/cochlear nerve or lack of cochlear development

• Ossification of any other cochlear anomaly that might prevent complete insertion of the electrode array.

• Medical neurological conditions that contraindicate undergoing surgery the pavenile diabetes or severe seizures/epilepsy.

6. **PROCESS OF COCHLEAR IMPLANTATION**

6.1. Pre-Operative Preparation

• Evaluation of hearing, speech & language, psychological/early communication education, another auditory processing followed by ally intervention using suitable hearing aid for 3 to 6 months.

• Depending upon in test findings and failing satisfactory performance or progress in intervention with suitable hearing aid, Cl candidacy will be determined and referral letter to empaneled surgeons and Hospital will be prepared.

• The parents will be asked to visit ENT surgeon of the recognized hospital, who will prescribe radiographic evaluation (CAT scan or MRI) of the inner ear and there upon surgeon will decide for surgery.

• The child will be prescribed vaccination by the surgeon and surgery will be scheduled 2-4 weeks after the child is vaccinated.

6.2 Surgical Procedure

The surgery will be performed by the ENT surgeon, Surgery is normally done under general anesthesia and surgery is usually of one to one and hall hour duration. The child may be hospitalized for 2-3 days. Surgical healing time is 2-3 weeks after the surgery. Thereafter, surgical stitches are removed.

6.3. Post-Operative Activities

Under ADIP Scheme Therapy & Mapping is free for 3 years post-surgery.

• Mapping of Cochlear Implant or Speech Processor Programming: Processor will be switched on 3-4 weeks after the surgery, the implant is switched ON and input to the device are set at comfortable levels. This procedure is known as mapping sessions Adjustment of these comfortable levels may need mapping for every fortnight or months initially and later at least once in a year or as per requirements.

• Audiological (Aural) Rehabilitation: Aural Rehabilitation in the form of Speech and Language stimulation, Auditory Verbal Therapy and parental counselling and educational guidance and training are routinely conducted for the child.

• Speech and Language Therapy Speech and language therapy up to three hours once a week for fen weeks, for a total of 30 hours should be conducted. The therapy sessions less than this may not be effective for the child to develop speech and language. The frequency of therapy sessions may be increased depending upon the need of the child, however, additional therapy sessions may be considered on prior approval from the competent authority. Follow-up visits for performance and progress evaluation will be conducted at 6,9 and 12 months of mapping and speech and language therapy.

7. **ADVANTAGES OF A COCHLEAR IMPLANT**

The children with the cochlear implant and enrolled in post -operative rehabilitation program show clear benefit and progress in their speech and language skills. Cochlear Implant can really be a life changing device. Some of the benefits with cochlear Implants are:

- It provides hearing to understand speech at a nearly normal intensity level.
- It facilitates and develops ability of the child to understand speech without lip reading
- It helps in hearing telephone, alarms, mobile ring tones and speech conversations of others.
- It makes watching and listening to TV & cinema are easier and effortless
- It Improves enjoyment and pleasure to listening music
- It helps in better perception of a variety of environmental sounds including soft, medium and loud like rustling of leaves and burst of crackers
- The child develops better voice quality, prosody, rhythm and intelligibility in production of speech

8. RISKS AND LIMITATIONS OF COCHLEAR IMPLANT

Cochlear implant surgery is very safe. The rate of complications associated with cochlear implant surgery and post implantation are rare.

However, in case of cochlear implant malfunction, the Revised ADIP scheme has in built provision of ten years of performance maintenance of CI along with up gradation of implant software used in the speech processor. Extended warranty of three years on the external parts of implant has also been provided under the scheme which is more than warranty period of any other prevailing cochlear Implant device in the market.

9. Check whether your child is a good candidate for a cochlear implant or not

Given here are check lists from 1 to 10. Read the check list carefully and the questions you may decide upon the candidacy of cochlear implantation for your child

1. Does your child has severe to profound SN hearing lose YES NO

2. I noticed hearing loss in my child within first two years of his/her life YES NO

3. Does your child is not benefitting with Hearing aid in terms of responding and hearing to speak even after attending regular speech and language therapy YES NO

4. Does your child has any psychological/cognitive problem as per psychologist YES NO

5. Does your ears are free from ear discharges and Infections YES NO

If your answer is "YES" for the above checklist questions then your child is most likely a good candidate for cochlear implant as per the ADIP schema guidelines. In such case, kindly
Contact to your nearest cochlear implant center, a team of experts at a cochlear implant center will help you in your decision making for cochlear implantation. When you are being evaluated for a cochlear implant, counselling will help you to have realistic expectations, as well as make sure that you understand the commitment required for teaching speech and language to your child with the user of cochlear implant. Typically, these experts include an ear doctor (otologist), audiologist, psychologist, social worker/counsellor, and speech language pathologist. The team works together to evaluate your child, perform the surgery, and offer follow-up care.

We Wish You
Happy Cochlear Implantation and Rehabilitation to Your Child

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Regional Centres and Composite Regional Centres

- Regional Centre, Kolkata, NILD Campus, B.T. Road, Bon Hooghly, Kolkata - 700 090 was established in 1984.
- Regional Centre, Noida at Plot No. – 19, Block – F, Sector – 12, Amltash Marg, Opposite to Noisa Stadium Gate No. 6 ,UP – 201301
- Regional Centre, Secunderabad at Manovikas Nagar, Bowenpally, Secunderabad - 500 009 was established in 1986.
- Regional Centre, Janla, at Janla, Dist. Khurda, Odisha - 752 054 was established in 1986.
- Composite Regional Centre (CRC) for Skill Development, Rehabilitation & Empowerment of Persons with Disabilities (Divyangjan), Ahmedabad at near Bhikshuk Gruh, G.I.D.C., Odhav, Ahmedabad - 382 415. was established on 16th August 2011 and functioning under the administrative control of AYJNISHD(D).
- Composite Regional Centre (CRC) for Skill Development, Rehabilitation & Empowerment of Persons with Disabilities (Divyangjan), Nagpur at Krida Prabodhini Hall, Yashwant Stadium, Dhantoli, Nagpur – 440 012 was established on 13th October, 2015 and functioning under the administrative control of AYJNISHD(D) from 1st May, 2020.
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- Composite Regional Centre (CRC) for Skill Development, Rehabilitation & Empowerment of Persons with Disabilities (Divyangjan), Chhatarpur at Old Tehsil Bhavan, Mahal Gate, Chhatarpur – 471 001 was inaugurated on 8th April, 2023 and functioning under the administrative control of AYJNISHD(D).
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- Composite Regional Centre (CRC) for Skill Development, Rehabilitation & Empowerment of Persons with Disabilities (Divyangjan), Goa was upgraded from Extension Counter of AYJNISHD(D) in 2024.